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**ARIZONA DEPARTMENT OF TRANSPORTATION \* MATERIALS GROUP**

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## **POLICY AND PROCEDURE DIRECTIVE**

TO: ALL MANUAL HOLDERS	PPD NO. 5
SUBJECT:  EVALUATION OF CONCRETE AGGREGATE SOURCES	EFFECTIVE DATE:  February 27, 2009

### **1. GENERAL**

1.1 This Policy and Procedure Directive supersedes P.P.D. No. 96-8.

1.2 This Policy and Procedure Directive outlines the procedure to be followed for the evaluation of concrete aggregate sources and their identification by the name of the source, the partial legal description, the latitude/longitude, and if appropriate, the source number assigned by the Materials Group Geotechnical Section or the Environmental and Enhancement Group.

1.3 Concrete aggregate sources that are subject to use by the Department are required to be tested initially, and thereafter at a minimum frequency of once every two years to determine suitability as sources of concrete aggregate.

### **2. SOURCE EVALUATION**

2.1 The Regional Materials Engineer is responsible to assure that the appropriate sampling and testing of concrete aggregate sources in their Region is performed.

2.2 To reduce the impact due to the volume of testing, a uniform distribution of sample submittals from concrete aggregate sources within a Materials Group Region should be considered.

2.3 Sampling of fine and coarse aggregate shall be performed in accordance with Arizona Test Method 105.

2.3.1 For each sample, a Sample Tabulation Ticket shall be completed with all appropriate information. The remarks area must also be completed to contain the name of the source, the partial legal description, the latitude/longitude, and if appropriate, the source number assigned by the Materials Group Geotechnical Section or the Environmental and Enhancement Group. The latitude/longitude shall be based on the NAD83 geodetic datum, and shall be expressed in decimal degrees to at least five decimal places.

2.3.2 If sodium sulfate soundness (Section 2.6.2), or any of the optional tests specified in Section 2.7 are to be performed, it shall be so noted in the remarks area of the Sample Tabulation Ticket.

2.4 The sampling of concrete aggregate sources for testing as outlined in Sections 2.6 and 2.7 shall be performed by ADOT personnel. For the mandatory testing specified in Section 2.6, a minimum of 55 lbs of fine aggregate and a minimum of 140 lbs of coarse aggregate shall be obtained. Typically, one 5-gallon bucket of fine aggregate and two 5-gallon buckets of coarse aggregate will be sufficient to meet these requirements. If the optional testing specified in Section 2.7.1 [Clay lumps and friable particles (AASHTO T 112)] or Section 2.7.2 [Lightweight particles, including coal and lignite (AASHTO T 113)] is required, the amount of coarse aggregate obtained shall be doubled. Testing may be performed by either the Central Laboratory or a Regional Laboratory. If both laboratories are used to evaluate a single source, it must be clearly communicated as to what testing each laboratory is to perform.

2.5 When the testing specified in Sections 2.6 and 2.7 is performed by a Regional Laboratory, the source location description (name of the source, partial legal description, latitude/longitude, and if appropriate, the source number assigned by the Materials Group Geotechnical Section or the Environmental and Enhancement Group) and the test results shall be submitted to the Materials Group Structural Materials Engineer.

2.6 The following mandatory tests will be performed by ADOT personnel:

- 2.6.1 Sieve analysis (Arizona Test Method 201) shall be determined on both the fine and coarse aggregate.
- 2.6.2 Sodium sulfate soundness (AASHTO T 104) shall be determined on both the fine and coarse samples when the aggregates are to be used in concrete placed above 4500 feet elevation.
- 2.6.3 Abrasion resistance (AASHTO T 96) shall be determined on the coarse aggregate.
- 2.6.4 Organic impurities (AASHTO T 21) shall be determined on the fine aggregate.
- 2.6.5 Mortar strength (AASHTO T 71, except Type II cement and graded sand conforming to the requirements of ASTM C 778 is to be used to determine the relative strength of the aggregate under test) shall be determined on the fine aggregate when results for AASHTO T 21 produce a color darker than the standard color.
- 2.6.6 Sand equivalent (AASHTO T 176) shall be determined on the fine aggregate.
- 2.6.7 Fractured coarse aggregate particles (Arizona Test Method 212) shall be determined on the coarse aggregate.

2.7 The following optional tests will be performed, by ADOT personnel, at the discretion of Materials Group:

- 2.7.1 Clay lumps and friable particles (AASHTO T 112) are determined on both the fine and coarse aggregate.
- 2.7.2 Lightweight particles, including coal and lignite, (AASHTO T 113, except the percent of lightweight particles shall be reported to the nearest 0.01%) are determined on both the fine and coarse aggregate.
- 2.7.3 Specific gravity and absorption (Arizona Test Method 210) are determined on the coarse aggregate.
- 2.7.4 Specific gravity and absorption (Arizona Test Method 211) are determined on the fine aggregate.

2.8 The following mandatory test(s) shall be performed by an independent materials testing laboratory approved by ADOT. The sampling shall be performed by the independent materials testing laboratory and witnessed by a representative of ADOT which has been appointed by the Regional Materials Engineer. The cost of the sampling and testing will be borne by the contractor or aggregate supplier. The Department reserves the right to perform the sampling and testing.

- 2.8.1 Concrete aggregate sources shall be tested for the determination of the Potential for Alkali Silica Reaction (ASR). When aggregates show potential for ASR, as indicated by expansions of 0.10% or greater at 16 days after casting when tested in accordance with ASTM C 1260, sufficient mitigation for the expansion shall be determined in accordance with ASTM C 1567. The test results, and other documentation required in Section 2.3.1, shall be submitted to the Regional Materials Engineer. The Regional Materials Engineer shall submit the information to the Materials Group Structural Materials Engineer.

### **3. SOURCE IDENTIFICATION BY PARTIAL LEGAL DESCRIPTION**

3.1 A partial legal description of the source must be provided by identifying the location of the source as described in Sections 3.5 and 3.6 below. The General (County) Highway Maps or other suitable maps are helpful in identifying the location of the source. Suitable maps are typically available at the District Administration Offices, the Regional Laboratories, or the Materials Group Geotechnical Section.

3.2 There are two principal meridians in Arizona: the Gila and Salt River Meridian, and the Navajo Meridian. The Gila and Salt River Meridian governs most of the state, while the Navajo Meridian governs only a very small area in the northeast part of Arizona. In Utah, the Salt Lake Meridian is the principal meridian that identifies the area in Southern Utah.

3.3 Examples illustrating the relationship of Township, Range, Section, and Section Subdivisions are given in the ADOT Construction Manual. For convenience, these items are included as Attachment #1 and Attachment #2, respectively, in this Policy and Procedure Directive.

3.4 Locate the position of the source as close as possible on the appropriate General Highway Map or other suitable map of the area. Determine the meridian (baseline) which governs the area and identify it by one of the following: (G) for the Gila and Salt River Meridian, (N) for the Navajo Meridian, and (S) for the Salt Lake Meridian. Determine the Township number (north or south), Range number (east or west), Section number, and the appropriate subdivisions of the Section.

3.5 Shown in the table below are the possible correct entries for the corresponding partial legal description items for the source location:

Partial Legal Description Item	Possible Correct Entries
Meridian (Baseline)	G, N, or S
Township	T N or T S
Range	R E or R W
Section	1 to 36
Quarter	NE, NW, SE, or SW
Half	N, S, E, or W

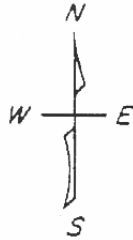
3.6 An example of the entries that should be shown in the remarks area of the sample tabulation ticket is as follows: "N, SW, NE, 4, T24S, R13W, G". This entry would be read as "the north half of the southwest quarter of the northeast quarter of Section 4, Township 24 South, Range 13 West, of the Gila and Salt River Meridian".

3.7 The concrete source location description and all test results from the evaluation of the concrete aggregate source will be maintained by the Materials Group.



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**1301 TOWNSHIP SUBDIVISION**

R.103 W. R.102 W.

R.102 W. R.101 W.

T. 43 N.	36 RANGE	LINE 31	32	33	34	35	36 RANGE	LINE 31
T. 42 N.	1	6	5	4	3	2	1	TOWNSHIP LINE 6
	12	7	8	9	10	11	12	7
	13	18	17	16	15	14	13	18
	24	19	20	21	22	23	24	19
	25	30	29	28	27	26	25	30
T. 42 N.	36	31	32	33	34	35	36	31
T. 41 N.	1	6	5	4	3	2	1	TOWNSHIP LINE 6

# 1302 SECTION SUBDIVISION

